

BIOHACK NOTES



CELL

THE UNIT OF LIFE

- BASED ON ACTIVE RECALL AND SPACED REPETITION
- TARGET 360/360 IN NEET BIOLOGY & 100/100 IN BOARDS!



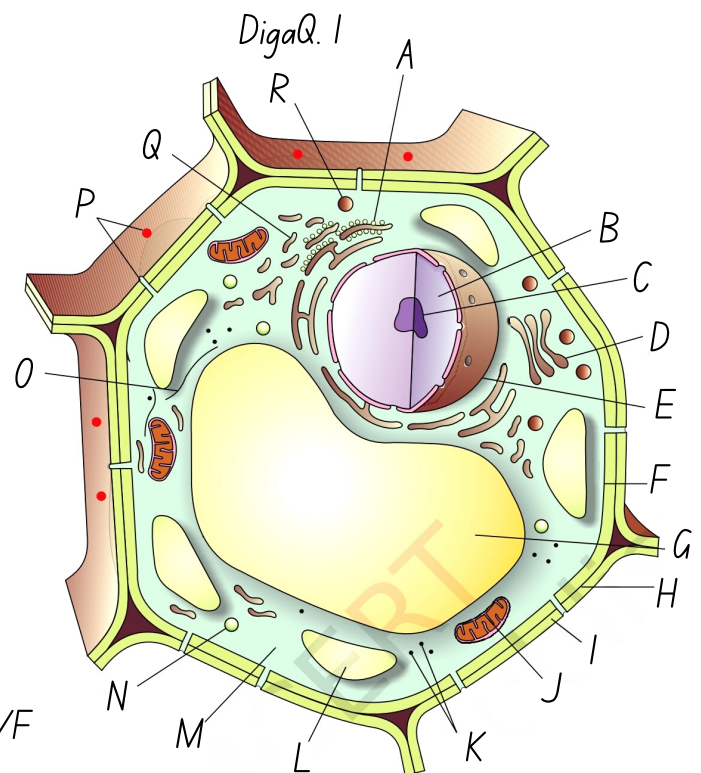
PARTH GOYAL





• INTRODUCTION

- 1) The physico-chemical approach to study and understand living organism is _____
- 2) _____ discovered the triple helical structure of collagen.
- 3) _____ first saw and described a live cell.
- 4) Cell was first seen by -
- 5) _____ discovered the nucleus
- 6) Matthias Schleiden was a German/British _____ (NEET)
- 7) Theodore Schwann a British/German _____. (NEET)
- 8) _____ proposed that the bodies of animals and plants are composed of cells and products of cells.
- 9) Cell theory was given by (2) -
- 10) _____ first explained that new cells are formed from pre-existing cells.
- 11) Omnis cellula-e cellula was given by -
- 12) Main arena of cellular activities in cell is - (NEET)
- 13) Prokaryotes have membrane bound organelles. T/F (NEET)
- 14) Microbodies are present in prokaryotes. T/F (NEET)
- 15) Ribosomes are non-membrane bound organelles. (NEET)
- 16) Organelles in which ribosomes are found (3) (NEET)
- 17) 2 non-membrane bound organelles are -
- 18) Centrosome help in -
- 19) Mycoplasmas are only _____ in length
- 20) Generally bacteria length is -
- 21) The largest isolated single cell is _____
- 22) Human red blood cells are about _____ in diameter.
- 23) Size of virus is -
- 24) Size of PPL0 is - (NEET 2020)
- 25) Size of typical eukaryotic cell is -



• PROKARYOTIC CELLS

- 26) The prokaryotic cells are represented by - (4)
- 27) Eukaryotes multiply more rapidly than prokaryotes. T/F
- 28) The four basic shapes of bacteria are -
- 29) Cell wall is present in all except -
- 30) Small extrachromosomal DNA is called _____
- 31) Plasmid DNA confers certain unique _____ to such bacteria. Ex - (1)



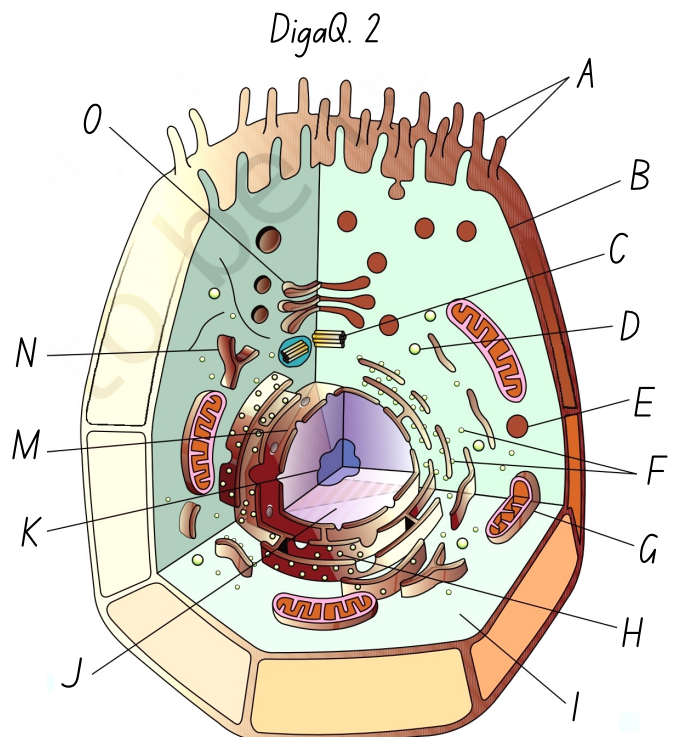
PARTH GOYAL

- 32) _____ is used to monitor bacterial transformation with foreign DNA.
- 33) Prokaryotes have something unique in the form of _____
- 34) Specialised differentiated form of cell membrane called _____ is the characteristic of _____
- 35) Prokaryotes have a chemically complex envelope. T/F
- 36) The 3 layer cell envelope consist of - (NEET)
- 37) All the 3 layer together act as a _____
- 38) Staining procedure developed by _____ divide bacteria into categories (2) -
- 39) Loose sheath glycocalyx called _____
- 40) Thick and tough glycocalyx called _____
- 41) Cell wall fxn (2)
- 42) Prokaryotic membrane is structurally similar to eukaryote. T/F
- 43) Extension of plasma membrane 3 forms are -
- 44) Mesosome help in (7) - (NEET)
- 45) In _____, other membranous extension into cytoplasm is present called _____ which contain _____
- 46) Bacterial flagella 3 parts -
- 47) Longest portion out of 3 is -
- 48) Cilia is absent in bacteria. T/F
- 49) _____are elongated tubular structures made of a special protein.
- 50) _____are small bristles like fibres sprouting out of the cell.
- 51) Pili help to attach bacteria to rocks in streams and host tissues. T/F
- 52) Ribosome size -
- 53) Ribosome subunit in prokaryotes -
- 54) Ribosome attach to single mRNA and form a chain called _____ or _____ (NEET)
- 55) Reserve material is stored as -
- 56) Inclusion bodies are bounded by membrane. T/F
- 57) Ex of inclusion bodies - (3)
- 58) Gas vacuoles are found in (3) -



• EUKARYOTIC CELLS

- 59) Extensive compartmentalisation is seen in _____
- 60) Organelle present in animal cell but absent in plant cell is -



• CELL MEMBRANE

61) Detailed structure of the membrane was studied only after the advent of _____

62) Cell membranes are composed of _____ with their polar head towards the outer/inner sides. (NEET)

63) Lipid component mainly consist of _____

64) Erythrocyte of _____ has approx. _____ % protein and _____ % lipids.

65) On the basis of _____, the 2 types of membrane proteins are -

66) Integral proteins are only partially buried in the membrane. T/F (NEET)

67) Fluid mosaic model was given by whom and in which year - (NEET)

68) The quasi-fluid nature of lipid helps in -

69) The ability to move within bilayer measure its _____

70) Fluid nature of membrane is also important because of fxns like (5)

71) Define osmosis.

72) Ex of active transport (1) - (NEET)

• CELL WALL

73) Cell wall is present in ___ and ___ (NEET)

74) Cell wall fxns (4)

75) Algae cell wall is made up of (4) - (NEET)

76) In other plants, it consist of (4) - (NEET)

77) The secondary wall is formed on the outer/inner side of the cell.

78) The middle lamella is a layer mainly of _____ (NEET)

79) Fxn of middle lamella -

80) _____ and _____ may be transversed by _____ which connect the cytoplasm of neighboring cells. (NEET)

• ENDOMEMBRANE SYSTEM

81) Endomembrane system include (4)

82) Functions are not coordinated in the endomembrane system. T/F

83) The ER divided the intracellular space into _____ and _____

84) Endoplasmic reticulum with ribosomes is called _____ (NEET)

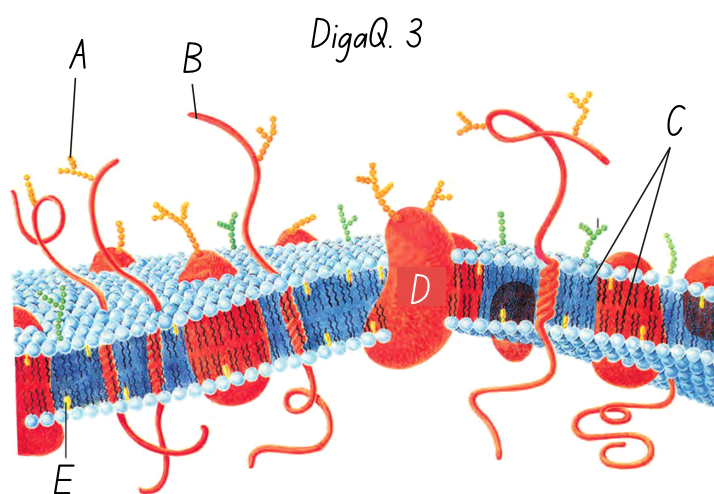
85) In absence of ribosome, it is called _____ (NEET)

86) _____ is frequently observed in the cells actively involved in protein synthesis and secretion. (NEET)

87) RER are continuous with -

88) SER fxns (2) - (NEET)

89) _____ in year _____ observed densely stained reticular structures near the nucleus.



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90) Golgi bodies consist of _____- shaped _____ or _____ (NEET)

91) The sacs and cisternae are of _____-_____ μm diameter.

92) They are stalked parallel/perpendicular to each other. (NEET)

93) _____ or _____ face is convex and _____ or _____ face is concave.

94) The cis and trans face of the organelle are entirely different. T/F

95) cis and trans face are not interconnected. T/F

96) Golgi Apparatus fxn -

97) Materials are packaged in the form of _____ (NEET)

98) Materials fuse with _____ face of golgi apparatus and emerge from _____ face.

99) Golgi apparatus is important site of formation of _____ and _____

100) Lysosomes are formed by the process of packaging in _____

101) Lysosomes are rich in _____ enzymes. (NEET)

102) Its enzymes are optimally active at acidic/basic pH. (NEET)

103) Vacuole contain (4) (NEET)

104) Vacuole membrane is called (NEET)

105) In plant cells, vacuoles can occupy up to _____ % of the volume of the cell.

106) Tonoplast fxn -

107) Concentration of ions is higher in cytoplasm than vacuole. T/F

108) In _____, contractile vacuole is important for _____

109) In _____, food vacuoles are formed by engulfing the food particles.

• MITOCHONDRIA & PLASTIDS

110) Mitochondria are stained by _____

111) It is _____ shaped with diameter of _____ μm (average _____ μm)

112) Its length is _____-_____ μm .

113) The inner compartment is called _____

114) The inner membrane forms a no. of infoldings called _____

115) Cristae fxn -

116) RNA is absent in mitochondria. T/F

117) Plastids are found in all plant cells and _____

118) Mitochondria is larger in size than plastids. T/F

119) 3 types of plastids are -

120) Chloroplast contains pigments (2)

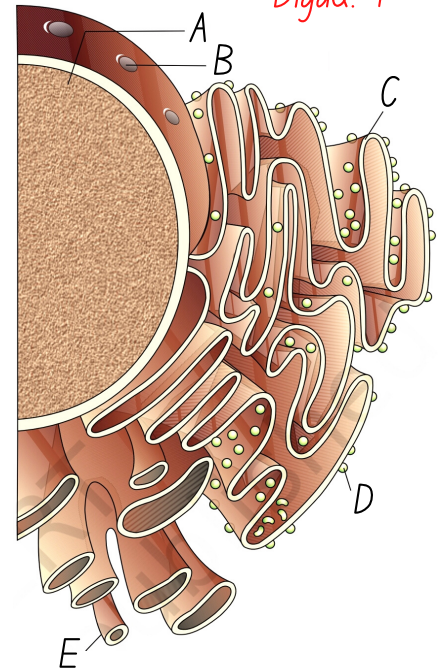
121) Chromoplast have _____ soluble _____ type of pigments like (2)

122) Leucoplast are colorful/colorless plastids. Tell their fxn.

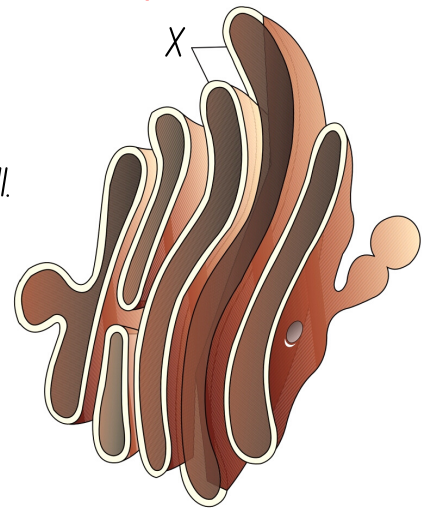
123) Potato contain which plastid -

124) Tell the 3 types of leucoplast and their function.

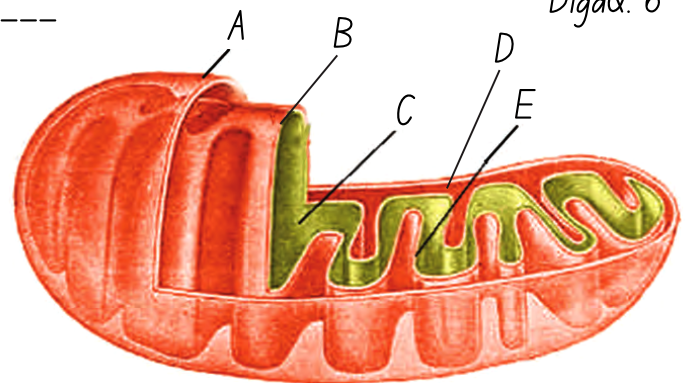
DigaQ. 4



DigaQ. 5



DigaQ. 6



PARTH GOYAL

125) Majority of chloroplast are found in _____ cells.

126) Length and width are -

127) Shapes of chloroplasts are (5) -

128) 1 chloroplast per cell is present in _____

129) Mesophyll cells have ___-___ chloroplast per cell.

130) Matrix in mitochondria is analogous to _____ in chloroplast.

131) The outer membrane is relatively less permeable. T/F

132) Thylakoids arrange in stacks to form _____ (NEET)

133) Thylakoid of different grana are connected by _____

134) The membrane of the thylakoids enclose a space called _____

135) Stroma contains enzymes required for the synthesis of carbohydrate only. T/F

136) It contains ssDNA. T/F (NEET)

137) Both chloroplast and mitochondria have _____ ribosomes.

• RIBOSOME, CYTOSKELETON, CILIA & FLAGELLA

138) They were observed by _____ in year _____

139) They are composed of _____ and _____ (NEET)

140) Here S is _____ unit stands for _____ coefficient. (NEET)

141) Svedberg's unit directly/indirectly measure _____ and _____ of ribosome.

142) 70s ribosome subunits are _____ and _____. Tell the types of rRNA in each subunit.

143) 80s ribosome subunits are _____ and _____. Tell the types of rRNA in each subunit.

144) An elaborate network of filamentous proteinaceous structures present in the cytoplasm is called _____ (NEET)

145) Cytoskeleton fxn (4)

146) _____ and _____ are hair like outgrowths of cell membrane. (NEET)

147) Prokaryotic and eukaryotic flagella are structurally similar. T/F

148) Cilia and flagella are not covered with plasma membrane. T/F

149) Their core is called _____

150) Axoneme possesses a number of microfilaments running parallel to the long axis. T/F

151) The axoneme have _____ no. of microtubules

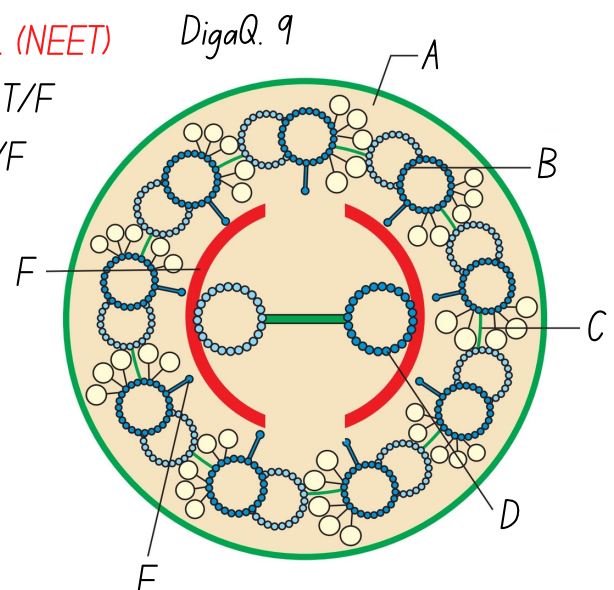
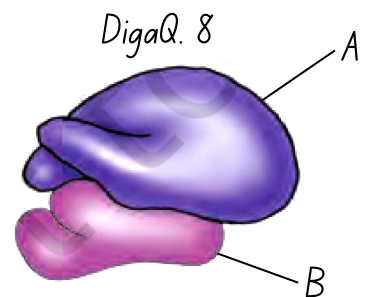
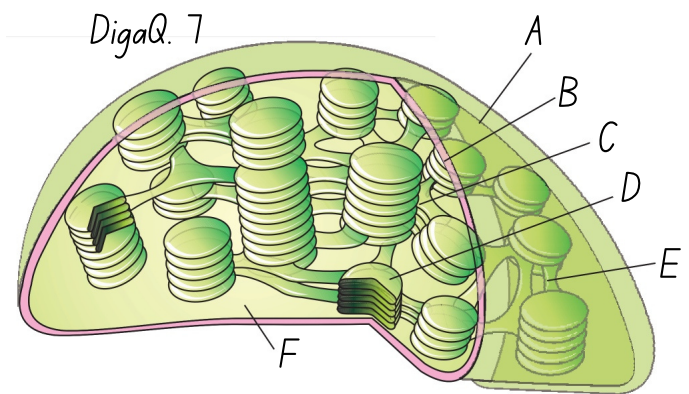
arranged laterally and _____ no. located in the centre. (NEET)

152) Such arrangement is called 9 + 1 as 9 pairs are laterally arranged and 1 pair is centrally located. T/F

153) The central tubules are connected by _____ and is enclosed by a _____

154) Central sheath is connected to one of the tubules of each peripheral doublets by a _____

155) Total no. of radial spokes in cilia are -



156) The peripheral doublets are also interconnected by _____

157) Both the cilium and flagellum emerge from _____ like structure called _____

DigaQ. 10

• CENTROSOME & CENTRIOLE

158) Centrosome contain 2 _____

159) Centrosome are surrounded by _____ called _____

160) The centrioles lie parallel/perpendicular to each other, which has an organisation like a _____

161) Arrangement is _____

162) Centriole have 9 even/uneven spaced peripheral fibrils of _____ protein.

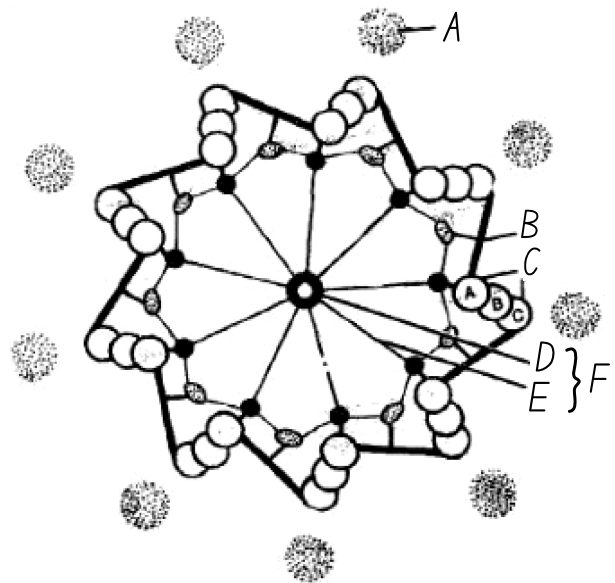
163) Each peripheral fibril is a doublet. T/F

164) The adjacent triplets are not linked. T/F

165) Central part of the centriole is called _____, which is connected with peripheral triplets by _____.

166) Hub and spokes are made of _____

167) Centrioles form (2) (NEET)



DigaQ. 11

• NUCLEUS & MICROBODIES

168) Nucleus was first described by _____ in year ____ (NEET)

169) The material of nucleus was stained by acidic/basic dyes was given the name _____ by _____

170) The interphase nucleus have nucleoprotein fibers called _____ (NEET)

171) What is perinuclear space ?

172) The outer membrane remains continuous with - (NEET)

173) Movement of _____ and _____ take place through nuclear pore.

174) Nucleoplasm contains (2) (NEET)

175) Nucleoli are _____ shaped structures. (NEET)

176) Nucleoli are membrane bound. T/F (NEET)

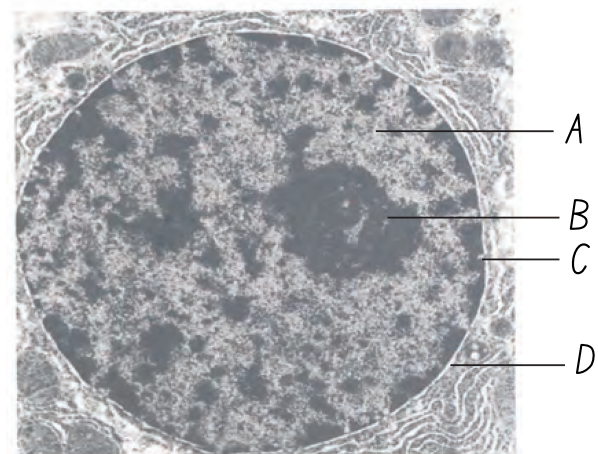
177) Active ribosomal RNA synthesis occur in _____ (NEET)

178) Chromatin contains non histone proteins. T/F

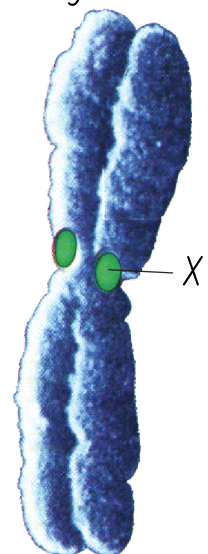
179) Chromatin contains (4) (NEET)

180) Human DNA is _____ m long.

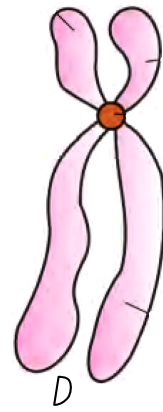
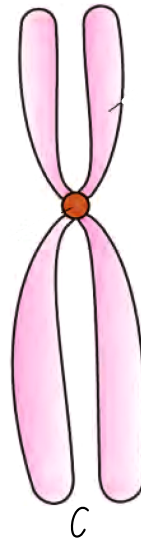
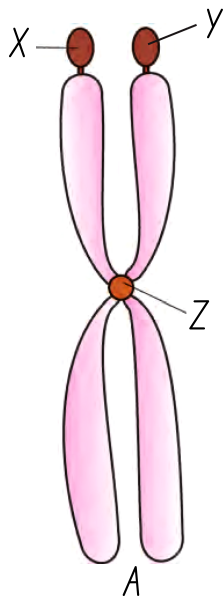
181) Primary constriction is called _____ on the side of which disc shaped structures _____ are present. (NEET)



DigaQ. 12



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182) Few chromosomes have staining/non staining secondary constriction.

183) The location of secondary constriction may change. T/F

184) Secondary constriction gives the appearance of a -----

185) Microbodies are not membrane bound. T/F

186) 3 examples of microbodies are -



CELL

THE UNIT OF LIFE



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ANSWERS

• INTRODUCTION

1. "Reductionist Biology"
2. G.N. Ramachandran
3. Anton Von Leeuwenhoek
4. Robert Hooke
5. Robert Brown
6. German botanist (Trick - B ke saath B nhi aata)
7. British zoologist (Trick - Schwann cell is in zoology)
8. Schwann
9. Schleiden and Schwann
10. Rudolf Virchow (1855)
11. Rudolf Virchow (1855)
12. Cytoplasm
13. F
14. F
15. T
16. Rough ER, chloroplast & mitochondria
17. Ribosome and centrosome
18. Cell division
19. $0.3 \mu\text{m}$
20. $3-5 \mu\text{m}$
21. Ostrich egg
22. $7.0 \mu\text{m}$
23. $0.02-0.2 \mu\text{m}$
24. $0.1 \mu\text{m}$
25. $10-20 \mu\text{m}$

• PROKARYOTIC CELLS

26. bacteria, BGA, mycoplasma and PPL0
27. F
28. bacillus (rod like), coccus (spherical), vibrio (comma shaped) and spirillum (spiral)
29. Mycoplasma
30. Plasmid DNA
31. Phenotypic characters, ex - antibiotic resistance
32. Plasmid DNA

33. Inclusions
34. Mesosome, prokaryotes
35. T
36. outermost glycocalyx, cell wall, plasma membrane
37. Protective unit
38. Gram, Gram +ve, Gram -ve
39. Slime layer
40. Capsule
41. Determines shape of the cell & provides a strong structural support
42. T (NCERT line)
43. vesicles, tubules and lamellae
44. Cell wall formation, DNA replication and distribution to daughter cells, respiration, secretion, increase surface area of the plasma membrane and enzymatic content
45. Cyanobacteria, chromatophores, pigments
46. Filament, hook and basal body
47. Filament
48. T
49. Pili
50. Fimbriae
51. F, fimbriae does
52. 15 nm by 20 nm
53. 50S and 30S
54. polyribosomes or polysome
55. Inclusion body
56. F
57. phosphate granules, cyanophycean granules and glycogen granules
58. blue green, purple and green photosynthetic bacteria



• EUKARYOTIC CELLS

59. Eukaryotes

60. Centriole

• CELL MEMBRANE

61. Electron microscope

62. Lipids, outer

63. Phosphoglycerides

64. Human, 52, 40

65. Ease of extraction,

2 types - integral and peripheral

66. F, partially or totally both

67. Singer and Nicolson (1972)

68. Lateral movement of protein

69. Fluidity

70. Cell growth, formation of intercellular junctions, secretion, endocytosis, cell division

71. Movement of water by diffusion through a semi-permeable membrane is called osmosis

72. Na^+/K^+ pump

• CELL WALL

73. Fungi and plants

74. Give shape to cell, protect cell from mechanical damage and infection, helps in cell-cell interaction, provide barrier to undesirable macromolecules

75. Cellulose, galactans, mannans and minerals like CaCO_3

76. Cellulose, hemicellulose, pectins and proteins

77. Inner

78. Calcium pectate

79. Holds different neighbouring cells together

80. Cell wall and middle lamella, plasmodesmata

• ENDOMEMBRANE SYSTEM

81. ER, Golgi complex, lysosomes and vacuoles

82. F

83. Luminal and extraluminal

84. RER

85. SER

86. RER

87. Nuclear membrane

88. Synthesis of lipids & steroids, detoxification of drugs

89. Camillo Golgi (1898)

90. Disc, sacs or cisternae

91. $0.5 \mu\text{m}$ - $1.0 \mu\text{m}$

92. Parallel

93. cis or forming, trans or maturing

94. T

95. F

96. Packaging, modification, transportation

97. Vesicles

98. Cis, trans

99. Glycoprotein and glycolipid

100. Golgi bodies

101. Hydrolytic

102. Acidic

103. Water, sap, excretory product and other non-useful material

104. Tonoplast

105. 90

106. Facilitates transport of a number of ions & other materials against conc. gradients into vacuole

107. F

108. Amoeba, excretion

109. Protists

• MITOCHONDRIA & PLASTIDS

110. Janus green

111. Sausage, 0.2 - $1.0 \mu\text{m}$ (average - $0.5 \mu\text{m}$)

112. 1.0 - $4.1 \mu\text{m}$

113. Matrix

114. Cristae

115. Increase surface area



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116. F
117. Euglenoids
118. F
119. Chloroplast, chromoplast, leucoplast
120. Chlorophyll, carotenoids
121. Fat, carotenoid, ex - carotene, xanthophyll
122. Colourless, store nutrients
123. Amyloplasts
124. Amyloplasts - store starch, Elaioplasts - store oils and fats, Aleuroplasts - store proteins
125. Mesophyll
126. Length (5-10 μ m) and width (2-4 μ m)
127. lens-shaped, oval, spherical, discoid or even ribbon-like
128. Chlamydomonas
129. 20-40
130. Stroma
131. F
132. Grana
133. Stroma lamella
134. Lumen
135. F, carbohydrate and protein both
136. F, dsDNA is present
137. 70s

• RIBOSOME, CILIA & FLAGELLA

138. George Palade (1953)
139. Protein and RNA
140. Svedberg's unit, sedimentation
141. Indirectly, density and size
142. 50s, 30s (30s contain 16S rRNA, 50s contain 23S and 5S rRNA)
143. 60s, 40s (60s contain 18S rRNA and 40s contain 28S, 5.8s, 5s rRNA)
144. Cytoskeleton
145. mechanical support, motility, maintenance of the shape of the cell

146. Cilia and Flagella
147. F
148. F
149. Axoneme
150. F, microtubules not microfilaments
151. 18, 2
152. F
153. Bridges, central sheath
154. Radial spoke
155. 9
156. Linkers
157. Centriole, basal bodies

• CENTROSOME & CENTRIOLE

158. Centrioles
159. amorphous pericentriolar materials
160. Perpendicular, cartwheel
161. 9 + 0
162. Even, tubulin
163. F, triplet
164. F, they are linked
165. Hub, radial spokes
166. Protein
167. basal body of cilia or flagella and spindle fibres

• NUCLEUS & MICROBODIES

168. Robert Brown (1831)
169. Basic, chromatin, Flemming
170. Chromatin
171. Space between two nuclear membrane
172. ER
173. RNA and proteins
174. Nucleolus and chromatin
175. Spherical
176. F



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177. Nucleolus
 178. T
 179. DNA, histones, some non-histone proteins & RNA
 180. 2 m
 181. Centromere, kinetochores
 182. Non-staining
 183. F
 184. Satellite
 185. F
 186. Peroxisomes, Sphaerosomes, Glyoxysomes

• DigaQs

- | | |
|-----------------------|------------------------|
| DigaQ. 1 - Plant cell | DigaQ. 2 - Animal cell |
| A - RER | A - Microvilli |
| B - Nucleus | B - Plasma membrane |
| C - Nucleolus | C - Centriole |
| D - Golgi apparatus | D - Peroxisome |
| E - Nuclear envelope | E - Lysosome |
| F - Plasma membrane | F - Ribosomes |
| G - Vacuole | G - Mitochondrion |
| H - Middle lamella | H - RER |
| I - Cell wall | I - Cytoplasm |
| J - Mitochondrion | J - Nucleus |
| K - Ribosomes | K - Nucleolus |
| L - Chloroplast | L - Nuclear envelope |
| M - Cytoplasm | M - SER |
| N - Peroxisome | N - Golgi apparatus |
| O - Microtubule | |
| P - Plasmodesmata | |
| Q - SER | |
| R - Lysosome | |
- DigaQ. 3 - Fluid mosaic model of plasma membrane
 A - Sugar
 B - Peripheral protein
 C - Phospholipid bilayer
 D - Integral protein
 E - Cholesterol

- DigaQ. 4 - Endoplasmic reticulum
 A - Nucleus
 B - Nuclear pore
 C - Rough endoplasmic reticulum
 D - Ribosome
 E - Smooth endoplasmic reticulum
- DigaQ. 5 - Golgi apparatus X - Cisternae
- DigaQ. 6 - Mitochondrion (Longitudinal section)
 A - Outer membrane
 B - Inner Membrane
 C - Matrix
 D - Inter-membrane space
 E - Crista
- DigaQ. 7 - Sectional view of chloroplast
 A - Outer membrane
 B - Inner Membrane
 C - Granum
 D - Thylakoid
 E - Stroma lamella
- DigaQ. 8 - Ribosome
 A - Large subunit
 B - Small subunit
- DigaQ. 9 - Section of cilia/flagella
 A - Plasma membrane
 B - Peripheral microtubules (doublets)
 C - Interdoublet bridge
 D - Central microtubule
 E - Radial spoke
 F - Central sheath
- DigaQ. 10 - TS of centriole
 A - Massule or pericentriolar satellite
 B - C-A connective
 C - Triplet fibril
 D - Central rod (hub)
 E - 9 spokes
 F - Cart-wheel structure

DigaQ. 11 - Structure of nucleus

A - Nucleoplasm

B - Nucleolus

C - Nuclear pore

D - Nuclear membrane

DigaQ. 12 - Chromosome X - Kinetochore

DigaQ. 13 - Types of chromosomes based on the position of centromere

A - metacentric X - Satellite

B - telocentric Y - Secondary constriction

C - sub-metacentric Z - Centromere

D - acrocentric



SCAN AND DONATE US SO THAT WE
CAN CREATE MORE SUCH QUALITY
CONTENT FOR YOU!

JUST ₹10-20 WILL BE APPRECIABLE! :)

STUDENT GET BIOHACKS BUT
DON'T NOT SHARING THEM WITH
THEIR FRIENDS...



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